

KIMBALL (L ROBERT) AND ASSOCIATES EBENSBURG PA F/6 13/13  
NATIONAL DAM INSPECTION PROGRAM. FISHPOND DAM (NDS ID NUMBER PA--ETC(U)  
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SUSQUEHANNA RIVER BASIN  
UNNAMED TRIBUTARY TO ROARING CREEK, COLUMBIA COUNTY

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PENNSYLVANIA  
**FISHPOND DAM**

NDS ID NO. PA-899  
DER ID NO. 19-81

**LEVEL II**

NICHOLAS SPOCK, M.D.

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM



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ELECTE  
AUG 15 1980  
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L. ROBERT KIMBALL & ASSOCIATES  
DACW31-80-C-0020

Prepared By

L. ROBERT KIMBALL & ASSOCIATES  
CONSULTING ENGINEERS & ARCHITECTS  
EBENSBURG, PENNSYLVANIA  
15931

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PENNSYLVANIA

*11/11/81 Dam Inspection*

*Project 10* **FISHPOND DAM**

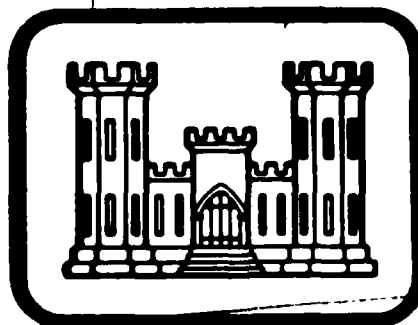
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*Unna*  
**NICHOLAS SPOCK, M.D.**

**PHASE I INSPECTION REPORT.**

**NATIONAL DAM INSPECTION PROGRAM**



*(15) DAM NO. 1 - DEC 1/81*

Prepared By

**L. ROBERT KIMBALL & ASSOCIATES**  
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15931

*(12) 1/1*

FOR

**DEPARTMENT OF THE ARMY**  
**BALTIMORE DISTRICT CORPS OF ENGINEERS**  
BALTIMORE, MARYLAND  
21203

*(11)* **JUN 1980**

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AUG 15 1980  
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## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

Accession For	FTIS GRAB	DDC TAB	Unannounced	Justification
By				
Distribution/				
Availability Codes				
Avail and/or special				
Dist				

PHASE I REPORT  
NATIONAL DAM INSPECTION REPORT

NAME OF DAM	Fishpond Dam
STATE LOCATED	Pennsylvania
COUNTY LOCATED	Columbia
STREAM	Unnamed tributary to Roaring Creek
DATE OF INSPECTION	November 20, 1979 & April 8, 1980

ASSESSMENT

The assessment of Fishpond Dam is based upon visual observations made at the time of inspection, review of available records and data, hydraulic and hydrologic computations and past operational performance.

The inspection and review of data of Fishpond Dam did not reveal any problem which requires emergency action. The dam appears to be in poor condition mainly because of extensive seepage which appears to be increasing. A monitoring program developed by a professional engineer knowledgeable in earth dams should be implemented immediately.

Fishpond Dam is a high hazard-small size dam. The SDF for a dam of this size and classification is 1/2 PMF to PMF. Based on the downstream potential for loss of life and property damage the spillway design flood has been selected as the PMF (Probable Maximum Flood). The spillway and reservoir are capable of controlling the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed adequate.

The following recommendations and remedial measures should be instituted immediately.

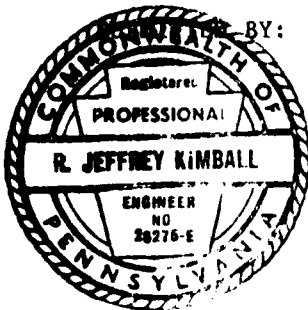
1. The seepage and wet areas located on the downstream slope and at the toe of the embankment should be monitored for turbidity and quantity at regular intervals and during periods of heavy precipitation. The monitoring program and the monitoring readings should be evaluated by a professional engineer experienced in dam design and construction. Measures to control seepage should be implemented as required.

2. Raise the height of the earth berm to the right of the emergency spillway to a minimum of top of dam elevation (See page A-12).

3. Provide erosion protection between the emergency spillway and the embankment.

FISHPOND DAM  
PA 899

4. Remove the small trees and brush from the spillway exit channel.
5. Repair the separated joints in the principal spillway riser pipe.
6. A warning system should be developed to warn downstream residents of large spillway discharges or imminent failure of the dam.
7. A safety inspection program should be implemented with inspections at regular intervals by qualified personnel.
8. The reservoir drain should be operated and lubricated on a regular basis.



BY:

L. ROBERT KIMBALL & ASSOCIATES  
CONSULTING ENGINEERS AND ARCHITECTS

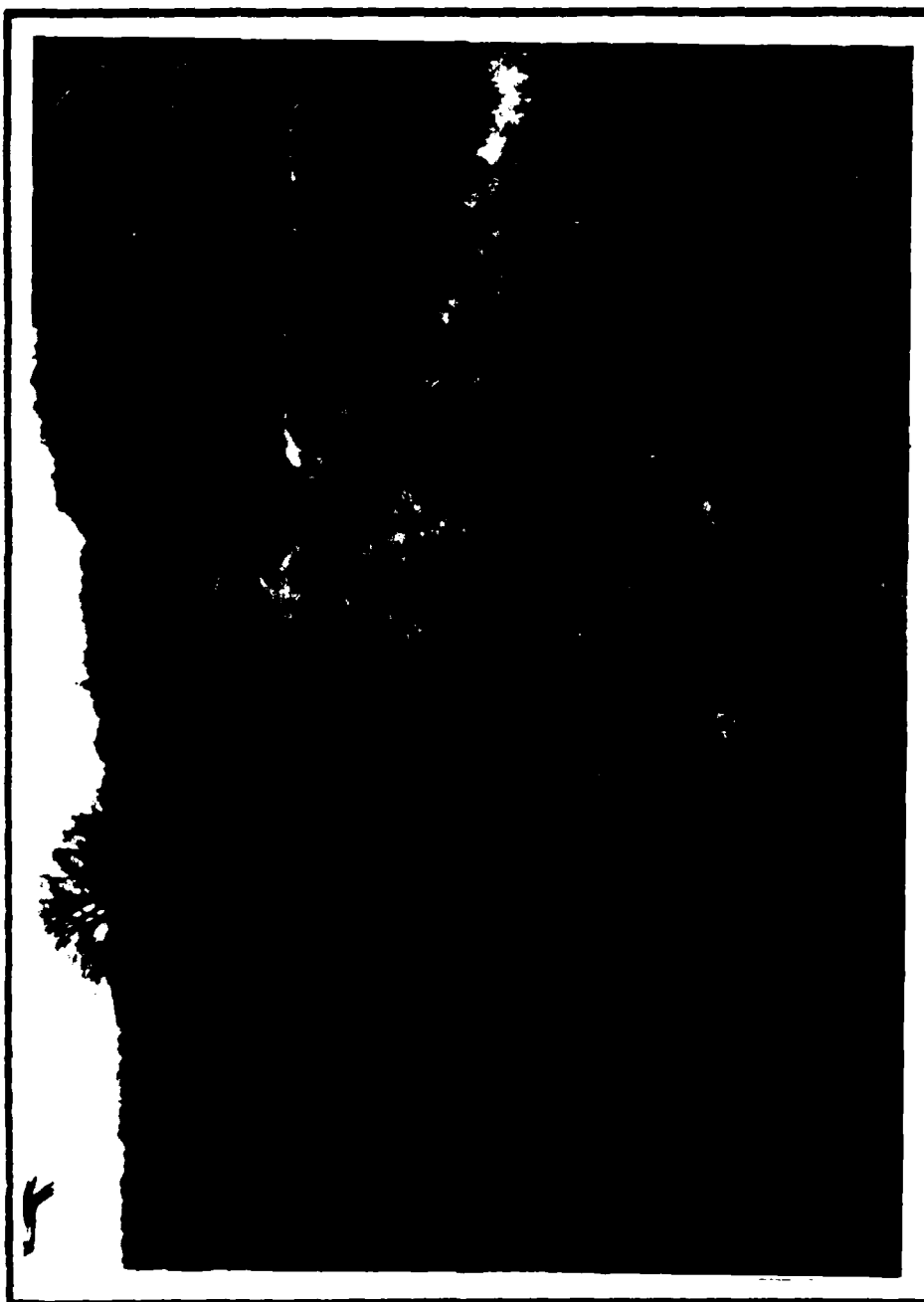
6-2-80  
Date

*R. Jeffrey Kimball*  
R. Jeffrey Kimball, P.E.

APPROVED BY:

11 July 1980  
Date

*James W. Peck*  
JAMES W. PECK  
Colonel, Corps of Engineers  
District Engineer



Overview of Fish Pond Dam and spillway (foreground).



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PHASE I  
NATIONAL DAM INSPECTION PROGRAM  
FISHPOND DAM  
NDI. I.D. NO. PA 899  
DER I.D. NO. 19-81

SECTION 1  
PROJECT INFORMATION

1.1 General.

a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Fishpond Dam is an earthfill dam, 39 feet high and 567 feet long. The crest width is 10 feet. The upstream slope is 2H:1V and grass covered. The downstream slope is 2.5H:1V and grass covered.

The principal spillway is a drop inlet structure consisting of a 30" corrugated metal riser and a 24" diameter corrugated metal outlet conduit. The riser is equipped with an anti-vortex device and a trash rack. The outlet conduit has four anti-seep collars. The emergency spillway is a trapezoidal shaped channel with a bottom width of 30 feet. The spillway is located on the left abutment. The control section of the spillway has side slopes of 6H:1V and 1.5H:1V on the left and right side, respectively.

b. Location. The dam is located on an unnamed tributary to Roaring Creek, Columbia County, Pennsylvania. Fishpond Dam can be located on the Shumans, U.S.G.S. 7.5 minute quadrangle.

c. Size Classification. Fishpond Dam is a small size structure (39 feet high, 227 ac-ft).

d. Hazard Classification. Fishpond Dam is a high hazard dam. Downstream conditions indicate that loss of more than a few lives is probable should the structure fail. Several dwellings are located approximately 4,000 feet downstream of the dam.

e. Ownership. Fishpond Dam is owned by Doctor Nicholas Spock. Correspondence should be addressed to:

Nicholas Spock, M.D.  
300 North Shamokin Street  
Shamokin, PA 17872  
(717) 648-2352

f. Purpose of Dam. Fishpond Dam is used for recreation.

g. Design and Construction History. Fishpond Dam was reconstructed in July, 1975, after the original dam failed in June, 1972. No information is available on the original design or construction of the dam. The new structure was built at the same location as the old structure and incorporated portions of the breached dam. The design engineer was Larry Younkin. The contractor was Homer Hayman, Orangeville, Pennsylvania.

h. Normal Operating Procedures. No operations are conducted at the dam. The principal spillway regulates normal flows into the reservoir. The reservoir drainline is reportedly opened once each year. The emergency spillway controls flows during flooding.

1.3 Pertinent Data.

a. Drainage Area. 0.21 square miles

b. Discharge at Dam Site (cfs).

Maximum known flood at dam site	Unknown
Drainline capacity at elevation 1043	48
Spillway capacity at top of dam	540

c. Elevation (U.S.G.S. Datum) (feet). - Field survey based on principal spillway crest elevation 1041.0 contained in design report.

Top of dam - low point	1046.9
Top of dam - design height	1047.0
Maximum pool - design surcharge	1047.0
Normal pool	1041.0
Principal spillway crest	1041.0
Emergency spillway crest (average)	1044.0
Upstream invert - 24" drainline	Unknown
Downstream invert - 24" drainline	1009.9
Streambed at centerline of dam	1008.0
Maximum tailwater	None
Toe of dam	1008.0

d. Reservoir (feet).

Length of maximum pool (PMF)	800 feet
Length of normal pool	700 feet

e. Storage (acre-feet).

Normal pool	170
Top of dam	227

f. Reservoir Surface (acres).

Top of dam	9
Normal pool	8
Spillway crest	8

g. Dam.

Type	Earthfill
Length	567 feet
Height	39 feet
Top width	10 feet
Side slopes - upstream	2H:1V
- downstream	2.5H:1V
Zoning	None
Impervious core	None
Cutoff	None
Grout curtain	None

h. Reservoir Drain.

Type	24" corrugated metal pipe
Length	200 feet
Closure	Gate valve with extension stem to princial spillway entrance
Access	Through principal spillway
Regulating facilities	Valve with extension stem at principal spillway

i. Spillway.

Type	Open cut in earth
Bottom width	30 feet
Crest elevation	1044.0
Upstream channel	Lake
Downstream channel	Open cut trapezoidal in earth

## SECTION 2 ENGINEERING DATA

2.1 Design. Review of information in the files of the Commonwealth of Pennsylvania, Department of Environmental Resources revealed that some correspondence, design drawings, design reports and permits were available for review. All of this data was reviewed for this study.

The design report consisted of the normal material expected to be utilized in the process of dam design. The report was in summary form for the most part but some test calculations were available for review. Three (3) triaxial compression tests were made of the proposed embankment material and results were indicated as follows: hole number 1 ( $C = 18.3$  psi,  $\text{PHI} = 5.77^\circ$ ), hole number 2 ( $C = 1.89$  psi,  $\text{PHI} = 2.78^\circ$ ), and hole number 3 ( $C = 9.6$  psi,  $\text{PHI} = 2.83^\circ$ ). The tests were the unconsolidated-undrained type. No indication was given as to the hole location. Test pits were dug as a means of some collection. Test numbers 1 and 2 were remolded specimens and test number 3 was described as relatively undisturbed.

2.2 Construction. Very little information is available on construction of the dam. The design engineer prepared a two page summary of the construction of the dam. No test results are contained in the report.

2.3 Operation. No operating records are maintained.

2.4 Evaluation.

a. Availability. Engineering data were provided by PennDER, Bureau of Dams and Waterways Management. The owner of the dam was interviewed in regards to operation and maintenance of the dam.

b. Adequacy. The amount of design data and other information is substantial. The Phase I report was based on visual inspection and hydrologic and hydraulic analyses. Sufficient information exists to complete a Phase I report.

SECTION 3  
VISUAL INSPECTION

3.1 Findings.

a. General. The onsite inspection of Fishpond Dam was conducted by personnel of L. Robert Kimball and Associates on November 20, 1979 and April 8, 1980. The inspection consisted of:

1. Visual inspection of the retaining structure, abutments and toe.
2. Examination of the spillway facilities, exposed portion of any outlet works and other appurtenant works.
3. Observations affecting the runoff potential of the drainage basin.
4. Evaluation of the downstream area hazard potential.

b. Dam. The dam appears to be in poor condition because of the extensive seepage exiting from the toe and right abutment. From a brief survey conducted during the inspection, it was noted that the crest of the dam generally rises towards the right abutment. The crest and upstream and downstream slopes of the dam were covered with grasses. The crest width is 10 feet. The upstream slope was measured at 2H:1V and the downstream slopes at 2.5H:1V. No riprap was placed on the upstream slope.

On November 20, 1979, two seepage areas were noted. The first area was located at the junction of the toe of dam and the right abutment. Seepage exiting from this area was measured at 85 gallons per minute. A second wet area and seepage area was located at approximately 150 feet to the left of the principal spillway discharge. Seepage exiting from this area collects at one location and was measured at 8 gallons per minute (see page A-12). On the second inspection trip to the site on April 8, 1980, the seepage exiting from the right abutment embankment contact area was essentially the same (85 gallons per minute). However, the seepage area 150 feet to the left of the principal spillway discharge was substantially increased from that which was measured on November 20, 1979. This seepage was measured to be 40 gallons per minute. In addition, a concentrated point discharge at the toe of dam was measured to be 15 gallons per minute. This concentrated point discharge was not noted during the earlier inspection. Runoff conditions were regarded as equal during each visit.

c. Appurtenant Structures. The reservoir level at the various times of inspection was approximately 1038.3. A leak

was present at the first joint below the water level in the 30" corrugated metal pipe principal spillway riser. Water entering through this separated joint and the extensive seepage kept the water level in the reservoir below the principal spillway crest. A valve exists near the downstream toe which is capable of controlling discharges through the drain.

The emergency spillway consists of an open cut on the left abutment and is trapezoidal in shape. A low spot is present on the earth berm separating the spillway discharge channel from the earth embankment. This low spot on the berm is approximately 1/2 foot lower than the top of dam elevation. During flood flows, overtopping of this earth berm may occur and cause erosion along the embankment abutment contact (See page A-13). No means of erosion protection is present between the spillway and the earth embankment. The spillway discharge channel is trapezoidal in shape and extends beyond the toe of dam.

d. Reservoir Area. The watershed is covered mostly with farmland. The reservoir slopes are gentle to moderate and do not appear to be susceptible to massive landslides which would affect the storage volume of the reservoir or cause overtopping of the dam by displacing water.

e. Downstream Channel. The downstream channel of the unnamed tributary to Roaring Creek is moderately wide.

3.2 Evaluation. The embankment appeared to be in poor condition because of the extensive seepage. The spillway and outlet works appear to be in fair condition.



SECTION 4  
OPERATIONAL PROCEDURES

4.1 Procedures. Water level is maintained below the principal spillway crest elevation because of the leak in the principal spillway riser and the extensive seepage through the dam. The reservoir drain was last opened in the summer of 1979.

4.2 Maintenance of the Dam. No planned maintenance schedule exists. No maintenance of the dam is conducted.

4.3 Maintenance of Operating Facilities. The operating facilities are not maintained. The condition of these facilities is considered poor.

4.4 Warning System in Effect. There is no warning system in effect to warn downstream residents of large spillway discharges or imminent failure of the dam.

4.5 Evaluation. The condition of the dam and operating facilities is considered poor. There is no warning system in effect to warn downstream residents.

SECTION 5  
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features.

a. Design Data. The DER files contained the hydrologic and hydraulic design calculations used in the design of these facilities. The SCS method was used to determine the hydrologic characteristics of the dam and watershed. The design calculations and drawings show the emergency spillway length to be 20 feet. However, the as-built width is approximately 30 feet.

b. Experience Data. No rainfall, runoff or reservoir level data were available. The old dam was overtopped in June, 1972 and breached. The dam was rebuilt in 1975. The new spillway has reportedly functioned adequately in the past.

c. Visual Observations. The spillway appeared to be in fair condition. A low point on the earth berm separating the spillway and the earth embankment was noted. Flow over this low point would cause some erosion to the right embankment abutment contact of the dam. No erosion protection was provided between the spillway and the dam.

d. Overtopping Potential. Overtopping potential was investigated through the development of the probable maximum flood (PMF) for the watershed and the subsequent routing of the PMF and fractions of the PMF through the reservoir and spillway.

The Corps of Engineers, Baltimore District, has directed that the HEC-1 Dam Safety Version systemized computer program be utilized. The program was prepared by the Hydrologic Engineering Center (HEC), U.S. Army Corps of Engineers, Davis, California, July, 1978. The major methodologies or key input data for this program are discussed briefly in Appendix D.

5.2 Evaluation Assumptions. To enable us to complete the hydraulic and hydrologic analysis for this structure, it was necessary to make the following assumptions.

1. Pool elevation prior to the storm was at the emergency spillway elevation, 1044.0. Flow through the principal spillway was not considered.

2. The low point on the earth berm separating the dam and the emergency spillway was not considered.

5.3 Summary of Overtopping Analysis. Complete summary sheets for the computer output are presented in Appendix D.

Peak inflow (PMF)	564 cfs
Spillway capacity	540 cfs

a. Spillway Adequacy Rating. The Spillway Design Flood (SDF) for this dam is 1/2 PMF to the PMF. The SDF is based on the hazard and size classification of the dam. Based on the hazard potential for this dam the PMF was selected as the spillway design flood. Based on the following definition provided by the Corps of Engineers, the spillway is rated as adequate as a result of our hydrologic analysis.

Adequate - All high hazard dams which pass the SDF (PMF).

The spillway and reservoir are capable of controlling the PMF without overtopping the dam. However, the earth embankment separating the dam and the spillway would be overtopped by .5 feet. This earth berm should be raised to a minimum elevation of 1047.0.

5.4 Summary of Breach Analysis. As the subject dam can satisfactorily pass the PMF without failure (based on our analysis) it was not necessary to perform the dam breach analysis and downstream routing of the flood wave.

## SECTION 6 STRUCTURAL STABILITY

### 6.1 Evaluation of Structural Stability.

a. Visual Observations. Minor erosion of the downstream embankment slope was noted during the inspection. Extensive seepage areas were noted during the inspections as noted in Section 3.1b. Two extensive seepage areas were observed. The seepage area 150 feet to the left of the principal spillway discharge pipe increased more than four times between the two inspections. In addition, a concentrated seepage zone was observed during the second inspection (See section 3.1b). An inspection conducted by DER personnel several years ago noted that only one seepage zone was present. Past observations and the fact that seepage increased substantially between our inspections indicates the seepage through this dam may be on the increase even though pool elevations at each inspection appeared equal.

b. Design and Construction Data. Design and construction data is available in the DER files. Stability analyses were conducted for this dam using the design slopes of 3H:1V. The stability analyses conducted for this dam meet the minimum design criteria. However, the as-built slopes are steeper than the designed and analyzed slopes.

c. Operating Records. No operating records are maintained.

d. Post Construction Changes. No post construction changes are known to have occurred since the structure was rebuilt in 1975.

e. Seismic Stability. The dam is located in seismic zone 1. No seismic stability analyses has been performed. Normally, it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake loading.

No signs of instability were noted during the inspections. However, long termed stability is questionable due to observed seepage.

SECTION 7  
ASSESSMENT AND RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The dam appears to be in poor condition mainly because of the extensive seepage which is present and appears to be on the increase. A seepage zone located approximately 150 feet to the left of the principal spillway discharge pipe increased more than four times between our two inspections. This seepage zone plus a seepage zone on the right abutment embankment contact makes a total seepage of approximately 125 gallons per minute. The visual observations, review of available data, hydrologic and hydraulic calculations and past operational performance indicate that Fishpond Dam's spillway is adequate. Some erosion protection should be provided for the emergency spillway. Maintenance and correction of the joint separation in the principal spillway riser should be performed.

b. Adequacy of Information. Sufficient information is available to complete a Phase I report.

c. Urgency. The recommendations suggested below should be implemented immediately.

d. Necessity for Further Investigation. In order to accomplish some of the recommendations/remedial measures outlined below, further investigations will be required.

7.2 Recommendations/Remedial Measures.

1. The seepage and wet areas located on the downstream slope and at the toe of the embankment should be monitored for turbidity and quantity at regular intervals and during periods of heavy precipitation. The monitoring program and the monitoring readings should be evaluated by a professional engineer experienced in dam design and construction. Measures to control seepage should be implemented as required.

2. Raise the height of the earth berm to the right of the emergency spillway to a minimum of top of dam elevation (See page A-12).

3. Provide erosion protection between the emergency spillway and the embankment.

4. Remove the small trees and brush from the spillway exit channel.

5. Repair the separated joints in the principal spillway riser pipe.

6. A warning system should be developed to warn downstream residents of large spillway discharges or imminent failure of the dam.

7. A safety inspection program should be implemented with inspections at regular intervals by qualified personnel.

8. The reservoir drain should be operated and lubricated on a regular basis.

APPENDIX A  
CHECKLIST, VISUAL INSPECTION, PHASE I

CHECK LIST  
VISUAL INSPECTION  
PHASE I

NAME OF DAM Fishpond Dam COUNTY Columbia STATE Pennsylvania ID# PA 899  
TYPE OF DAM Earthfill HAZARD CATEGORY High  
DATE(s) INSPECTION November 20, 1979  
April 8, 1980 WEATHER Clear and warm TEMPERATURE 50°

POOL ELEVATION AT TIME OF INSPECTION 1038.3 M.S.L. TAILWATER AT TIME OF INSPECTION None M.S.L.

INSPECTION PERSONNEL:

R. Jeffrey Kimball, P.E. - L. Robert Kimball and Associates

James T. Hockensmith - L. Robert Kimball and Associates

O.T. McConnell - L. Robert Kimball and Associates

James T. Hockensmith RECORDER



# EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Minor erosion on downstream slope.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Several slight bends on horizontal alignment. Low spot on crest near emergency spillway.	
RIPRAP FAILURES	No riprap on upstream slope.	

# EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	Grass and brush on slopes. Some brush in emergency spillway exit channel.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Appears to be good with the exception of the high rate of seepage exiting from the right abutment.	
ANY NOTICEABLE SEEPAGE	Extensive seepage on the right abutment embankment contact and approximately 150 feet to the left of the emergency spillway discharge channel. Between November 11, 1979 and April 8, 1980, the seepage increased more than 4 times at the seepage to the left of the principal spillway discharge pipe. None.	
STAFF GAUGE AND RECORDER		
DRAINS	None.	

**CONCRETE/MASONRY DAMS**

<b>VISUAL EXAMINATION OF</b>	<b>OBSERVATIONS</b>	<b>REMARKS OR RECOMMENDATIONS</b>
<b>ANY NOTICEABLE SEEPAGE</b>	Not applicable.	
<b>STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS</b>	Not applicable.	
<b>DRAINS</b>	Not applicable.	
<b>WATER PASSAGES</b>	Not applicable.	
<b>FOUNDATION</b>	Not applicable.	

# EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Not applicable.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Not applicable.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Not applicable.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Not applicable.	
RIPRAP FAILURES	Not applicable.	

# CATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not applicable.	
APPROACH CHANNEL	Not applicable.	
DISCHARGE CHANNEL	Not applicable.	
BRIDGE AND PIERS	Not applicable.	
GATES AND OPERATION EQUIPMENT	Not applicable.	

# OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Principal spillway pipe consists of a 24" corrugated metal pipe with a 30" riser. Unobserved except at the ends. First joint is separated below the intake structure on the riser pipe.	
INTAKE STRUCTURE	Concrete appears to be in fair condition.	
OUTLET STRUCTURE	24" corrugated metal pipe. Discharges directly at the toe of dam.	
OUTLET CHANNEL	None.	
EMERGENCY GATE	Not operated during the inspection.	

# UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Trapezoidal shaped, open cut in earth. Appears to be in fair condition. Needs riprap on embankment contact. Low spot on earth berm separating the left abutment of the dam and the spillway exit channel.	
APPROACH CHANNEL	Lake.	
DISCHARGE CHANNEL	Trapezoidal shaped, open cut. Several trees in exit channel.	
BRIDGE AND PIERS	None.	

# DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Narrow channel until unnamed tributary reaches Roaring Creek. Several houses located approximately 4,000 feet downstream of the dam.	
SLOPES	Appear to be stable.	
APPROXIMATE NO. OF HOMES AND POPULATION	Approximately 3 homes - 15 people within 7,000 feet of the dam.	



# RESERVOIR

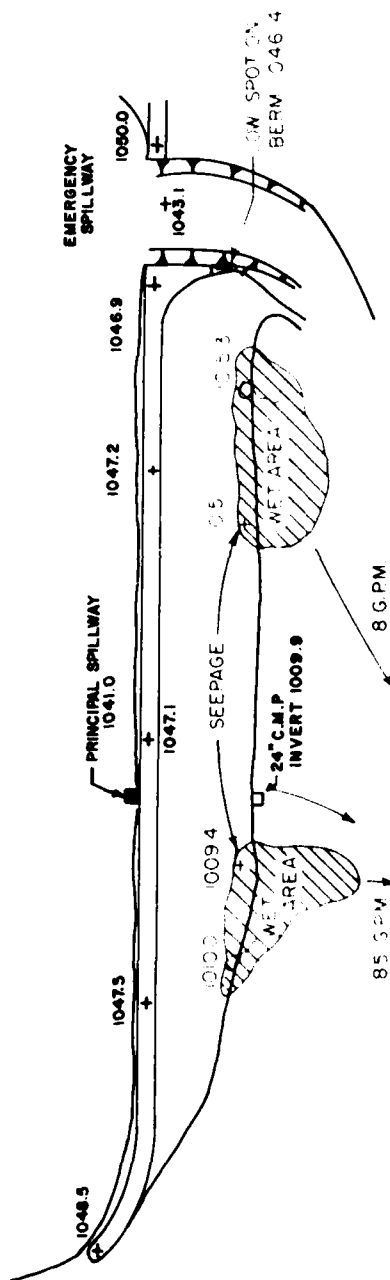
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gentle slopes. Appear to be stable.	
SEDIMENTATION	Does not appear to be excessive.	

# INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	

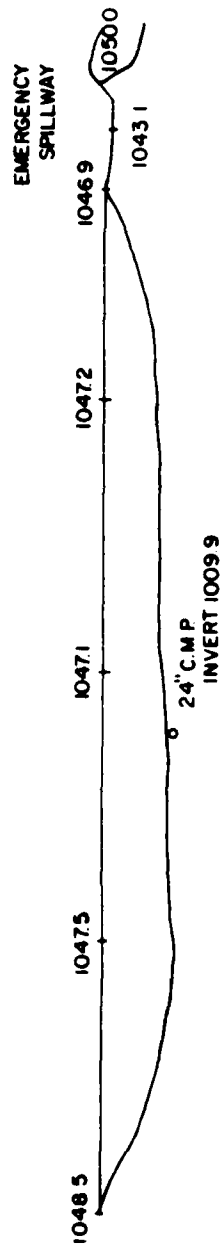


RESERVOIR  
+ 1038.3



FISHPOND DAM  
Scale 1"=100'





PROFILE  
LOOKING UPSTREAM  
(SCALE 1"=100')

FISHPOND DAM



APPENDIX B  
CHECKLIST, ENGINEERING DATA, DESIGN, CONSTRUCTION, OPERATION,  
PHASE I

**CHECK LIST**  
**ENGINEERING DATA**  
**DESIGN, CONSTRUCTION, OPERATION**  
**PHASE I**

NAME OF DAM Fishpond Dam  
 ID# PA 899

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. quadrangle.
CONSTRUCTION HISTORY	Brief report in Der files.
TYPICAL SECTIONS OF DAM	On construction drawings.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS RAINFALL/RESERVOIR RECORDS	DER files. DER files. DER files. DER files. None.

ITEM	REMARKS
DESIGN REPORTS	In DER files.
GEOLOGY REPORTS	DER files.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	DER files.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	DER files.
POST-CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	DER files.

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None since construction in 1975.
HIGH POOL RECORDS	None.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Dam failed in June, 1972, due to overtopping.
MAINTENANCE OPERATION RECORDS	None.



ITEM	REMARKS
SPILLWAY PLAN  SECTIONS  DETAILS	Construction drawings in DER files.
OPERATING EQUIPMENT PLANS & DETAILS	None.

APPENDIX C  
PHOTOGRAPHS

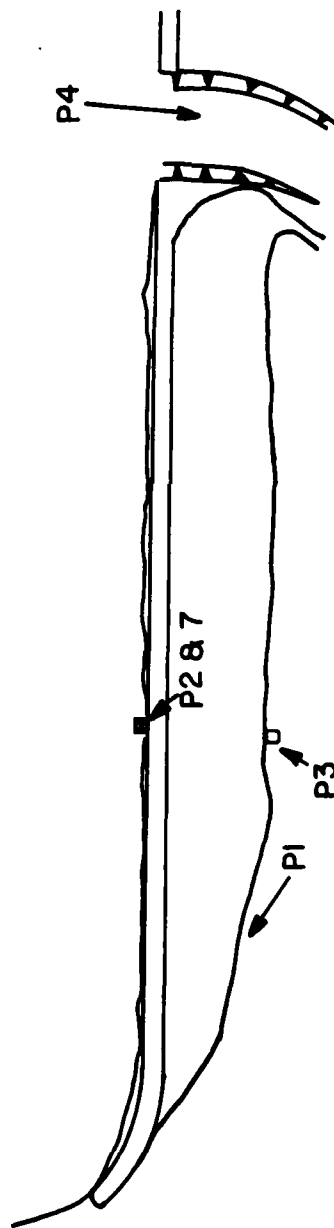


PHOTO INDEX  
FISHPOND DAM  
SCALE 1"=100'

P-INDICATES PHOTO LOCATION

## FISHPOND DAM

### Photo Descriptions

#### Sheet 1. Front

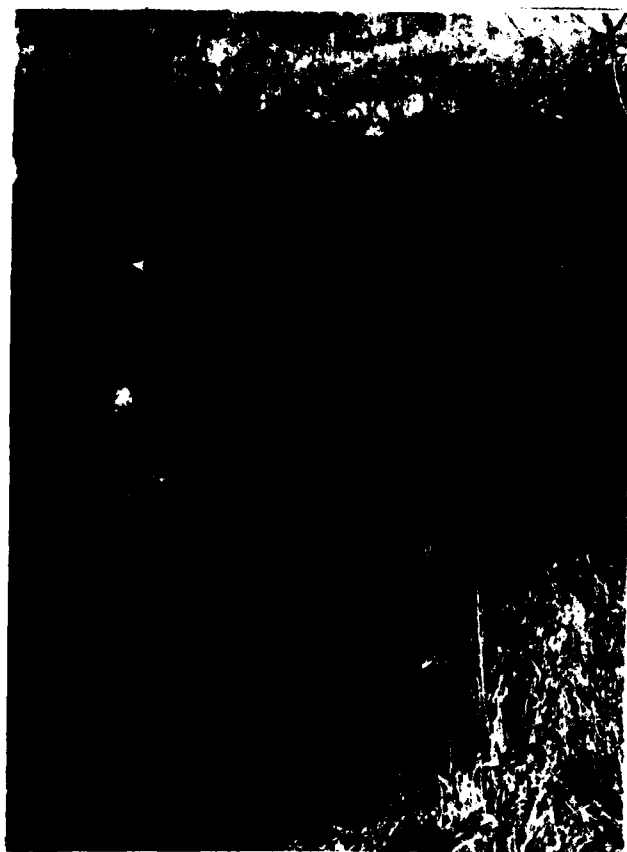
- (1) Upper left - Seepage area along right abutment/embankment contact.
- (2) Upper right - Intake structure on principal spillway.
- (3) Lower left - Principal spillway discharge and seepage areas at toe of dam.
- (4) Lower right - Earth spillway control section and discharge channel.

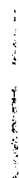
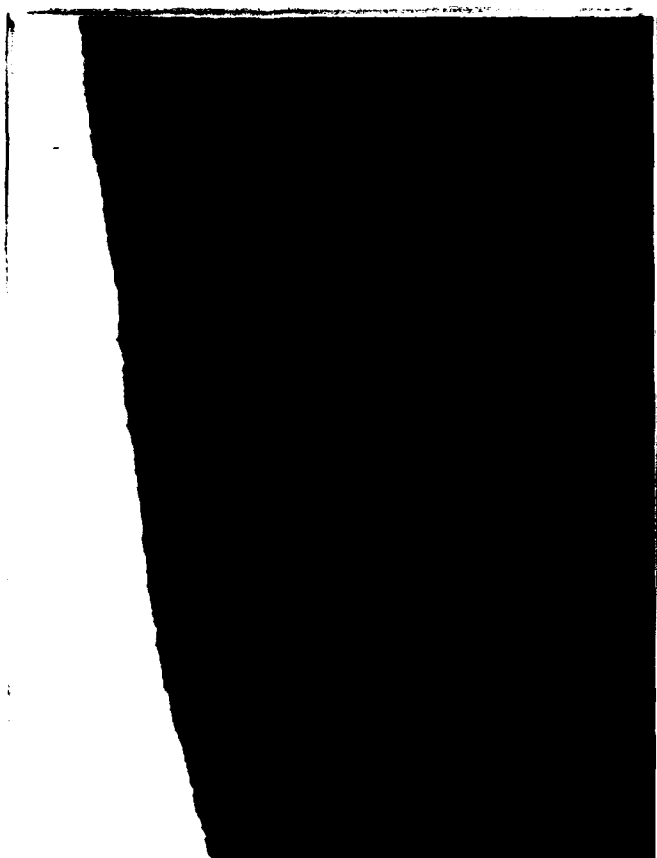
#### Sheet 1. Back

- (5) Upper left - Downstream exposure.
- (6) Lower left - Downstream exposure.
- (7) Lower right - Corrugated metal principal spillway pipe inside intake structure.

TOP OF PAGE

1	2
3	4





APPENDIX D  
HYDROLOGY AND HYDRAULICS

APPENDIX D  
HYDROLOGY AND HYDRAULICS

Methodology. The dam overtopping and breach analyses were accomplished using the systemized computer program HEC-1 (Dam Safety Investigation), September, 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. A brief description of the methodology used in the analysis is presented below.

1. Precipitation. The Probable Maximum Precipitation (PMP) is derived and determined from regional charts prepared from past rainfall records including "Hydrometeorological Report No. 40" prepared by the U.S. Weather Bureau.

The index rainfall is reduced from 10% to 20% depending on watershed size by utilization of what is termed the HOP Brook adjustment factor. Distribution of the total rainfall is made by the computer program using distribution methods developed by the Corps.

2. Inflow Hydrograph. The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for reservoir routing.

The unit hydrograph is developed using the Snyder method. This method requires calculation of several key parameters. The following list gives these parameters their definition and how they were obtained for these analysis.

Parameter	Definition	Where Obtained
Ct	Coefficient representing variations of watershed	From Corps of Engineers*
L	Length of main stream channel miles	From U.S.G.S. 7.5 minute topographic
Lca	Length on main stream to centroid of watershed	From U.S.G.S. 7.5 minute topographic
Cp	Peaking coefficient	From Corps of Engineers*
A	Watershed size	From U.S.G.S. 7.5 minute topographic

\*Developed by the Corps of Engineers on a regional basis for Pennsylvania.



3. Routing. Reservoir routing is accomplished by using Modified Plus routing techniques where the flood hydrograph is routed through reservoir storage. Hydraulic capacities of the outlet works, spillways and the crest of the dam are used as outlet controls in the routing.

The hydraulic capacity of the outlet works can either be calculated and input or sufficient dimensions input and the program will calculate an elevation discharge relationship.

Storage in the pool area is defined by an area - elevation relationship from which the computer calculates storage. Surface areas are either planimetered from available mapping or U.S.G.S. 7.5 minute series topographic maps or taken from reasonably accurate design data.

4. Dam Overtopping. Using given percentages of the PMF the computer program will calculate the percentage of the PMF which can be controlled by the reservoir and spillway without the dam overtopping.

5. Dam Breach and Downstream Routing. The computer program is equipped to determine the increase in downstream flooding due to failure of the dam caused by overtopping. This is accomplished by routing both the pre-failure peak flow and the peak flow through the breach (calculated by the computer with given input assumptions) at a given point in time and determining the water depth in the downstream channel. Channel cross-sections taken from U.S.G.S. 7.5 minute topographic maps were used in the downstream flood wave routing. Pre and post failure water depths are calculated at locations where cross-sections are input.

# HYDROLOGY AND HYDRAULICS ANALYSIS DATA BASE

NAME OF DAM: Fishpond Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 (1.05) = 23.3 inches

STATION	1	2	3
---------	---	---	---

Station Description	Fishpond Dam
---------------------	--------------

Drainage Area (square miles)	0.21
---------------------------------	------

Cumulative Drainage Area (square miles)	0.21
--	------

Adjustment of PMF for Drainage Area (%) <sup>(1)</sup>	
6 hours	117
12 hours	127
24 hours	136
48 hours	143
72 hours	145

Snyder Hydrograph	
Parameters	
Zone <sup>(2)</sup>	13
C <sub>p</sub> <sup>(3)</sup>	0.5
C <sub>t</sub> <sup>(3)</sup>	1.85
L (miles) <sup>(4)</sup>	1.09
L <sub>ca</sub> (miles) <sup>(4)</sup>	0.43
t <sub>p</sub> = C <sub>t</sub> (LxL <sub>ca</sub> ) 0.3 hrs.	1.47

Spillway Data	
Crest Length (ft)	30'
Freeboard (ft)	2.9'
Discharge Coefficient	C' = 0.95
Exponent	N/A

- (1) Hydrometeorological Report 40 (Figure 1), U.S. Army Corps of Engineers, 1965.
- (2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's coefficients (C<sub>p</sub> and C<sub>t</sub>).
- (3) Snyder's Coefficients.
- (4) L=Length of longest water course from outlet to basin divide.  
L<sub>ca</sub>=Length of water course from outlet to point opposite the centroid of drainage area.

CHECK LIST  
HYDROLOGIC AND HYDRAULIC  
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: D.A.=0.21 mi<sup>2</sup> Wooded-gentle slopes

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 170 ac-ft

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 227 ac-ft

ELEVATION MAXIMUM DESIGN POOL: 1047.0

ELEVATION TOP DAM: 1046.9

SPILLWAY CREST:	Emergency	Principal
a. Elevation	<u>1044.0</u>	<u>1041</u>
b. Type	<u>Trapezoidal</u>	<u>Drop inlet</u>
c. Width	<u>30'</u>	<u>30" CMP</u>
d. Length	<u>Approximately 100 feet</u>	<u>200 feet</u>
e. Location Spillover	<u>Left abutment</u>	<u>Reservoir</u>
f. Number and Type of Gates	<u>None</u>	<u>1</u>

OUTLET WORKS:

a. Type	<u>Drop inlet</u>
b. Location	<u>Through reservoir</u>
c. Entrance inverts	<u>Unknown</u>
d. Exit inverts	<u>1009.9 feet</u>
e. Emergency draindown facilities	<u>24" CMP</u>

HYDROMETEOROLOGICAL GAUGES:

a. Type	<u>None</u>
b. Location	<u>None</u>
c. Records	<u>None</u>

MAXIMUM NON-DAMAGING DISCHARGE: Unknown

.....  
FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 26 FEB 79  
.....

1	A1	ANALYSIS OF OVERTOPPING USING RATIOS OF PMF
2	A2	HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF FISHPOUND DAM(1899)
3	A3	RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

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1. **Introduction**  
 2. **Background**  
 3. **Methodology**  
 4. **Results**  
 5. **Discussion**  
 6. **Conclusion**  
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Year	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
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Year	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
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 FLOOD HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 26 FEB 79  
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RUN DATE: 80/04/24  
 TIME: 10.55.38.

ANALYSIS OF OVERTOPPING USING RATIOS OF PMF  
 HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF FISHPOND DAM(899)  
 RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IMR	IMIN	METRC	IPLT	IPRT	NSTAN
288	0	15	0	0	0	0	0	0	0

\*\*\*\*\*

MULTI-PLAN ANALYSES TO BE PERFORMED

PLAN= 1 NRATIO= 6 LRATIO= 1  
 RATIO= .10 .20 .30 .40 .50 .60 .70 .80 .90 1.00

\*\*\*\*\*

SUB-AREA RUNOFF COMPUTATION

INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IMYDG	IUMG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	.21	0.00	.21	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	117.00	127.00	131.00	143.00	145.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LRPT	STKR	OLTKH	MTIOL	ERAIN	SINKS	RTIOK	STIRL	CNSTL	ALSMX	MTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA  
TP= 1.47 CP= .50 NTA= 0

RECESSION DATA

STR1Q=	-1.50	QRC5N=	1	-0.05	W10R=	2.00
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APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 6.37 AND R= 7.92 INTERVALS

UNIT HYDROGRAPH 46 END-OF-PERIOD ORDINATES, LAG=						1.48 HOURS, CP=	.50	VOL=	1.00
3.	10.	21.	32.	42.	46.	45.	41.	36.	32.
20.	24.	22.	19.	17.	15.	13.	11.	10.	9.

	7.	6.	5.	5.	4.	4.	3.	3.
0.								
2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	0.	0.	0.	0.	0.		

## HYDROGRAPH ROUTING

## ROUTE

[illegible]

CROSS	CROSS	Avg	RES	ISAME	IORT	IPMP	LSTR
0.0	0.000	0.00	1	0	0	0	0
0.0	0.000	0.00	2	1	0	0	0

NSIPS	NSIDL	LAG	AMSK	X	TSK	STORA	ISPRAT
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[illegible][illegible]

CAPACITY.	0.	2.	14.	47.	100.	165.	255.	302.
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ELEVATION=	995.	1000.	1010.	1020.	1030.	1040.	1050.	1060.
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CREL	SPWD	COQW	EXPM	ELEV	COOL	CAREA	EXPL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1064.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DATA DATA

TOPEL	COOD	EXPD	DAMWID
1046.9	3.0	1.5	5.0

CREST LENGTH AT OR BELOW ELEVATION	5.	10.	360.	517.	583.	602.	692.	762.
ELEVATION	1046.9	1047.0	1047.5	1048.0	1049.0	1050.0	1055.0	1060.0

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS  
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)  
. AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
HYDROGRAPH AT	1	.21	1	.56	.113	.169	.226	.282	.564
	(	.54)	(	1.60)	( 3.19)	( 4.79)	( 6.39)	( 7.98)	( 15.97)
ROUTED TO	2	.21	1	.48	.101	.154	.210	.265	.543
	(	.54)	(	1.37)	( 2.86)	( 4.35)	( 5.94)	( 7.50)	( 15.38)

# SUMMARY OF DAM SAFETY ANALYSIS

PLAN I	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION		TIME OF		TIME OF FAILURE HOURS
						OVER TOP	HOURS	MAX	OUTFLOW HOURS	
ELEVATION STORAGE OUTFLOW		1044.00	0.00	207.	48.	0.00	42.25	0.00	0.00	
		1045.01	0.00	210.	101.	0.00	42.00	0.00	0.00	
		1045.34	0.00	213.	154.	0.00	42.00	0.00	0.00	
		1045.64	0.00	216.	210.	0.00	41.75	0.00	0.00	
		1045.89	0.00	218.	265.	0.00	41.75	0.00	0.00	
	1.00	1046.92	.02	227.	540.	.50	41.50	0.00	0.00	



L. ROBERT KIMBALL & ASSOCIATES  
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EBENSBURG PENNSYLVANIA

DAM NAME FISHPOND DAM

I.D. NUMBER \_\_\_\_\_

SHEET NO. 1 OF 4

BY JAL DATE 4-21-80

### LOSS RATE AND BASE FLOW PARAMETERS

AS RECOMMENDED BY CORPS OF ENGINEERS BALTIMORE DISTRICT

STRCL = 1 INCH

CNSTL = 0.05 IN/HR

STRCLA = 1.5 CFS/MI<sup>2</sup>

QRCSN = 0.05 (5% OF PEAK FLOW)

RTIOR = 2.0

### ELEVATION - STORAGE CAPACITY RELATIONSHIPS

FROM USGS 7.5 MIN QUADRANGLE, AND FIELD INSPECTION DATA

ELEV.	AREA (AC)	AVERAGE AREA (AC)	DEL	Δ STORAGE (AC-FT)	Σ STORAGE
995	0				0
		0.32	5	1.60	
1000	0.64				1.60
		1.20	10	12.0	
1010	1.75				13.60
		3.32	10	33.2	
1020	4.88				46.80
		5.29	10	52.9	
1030	5.69				99.70
		6.57	10	65.7	
1040	7.44				165.40
		8.91	10	89.1	
1050	10.38				254.50
		12.72	10	127.2	
1060	15.06				381.70

(SEE CHART ON NEXT PAGE)





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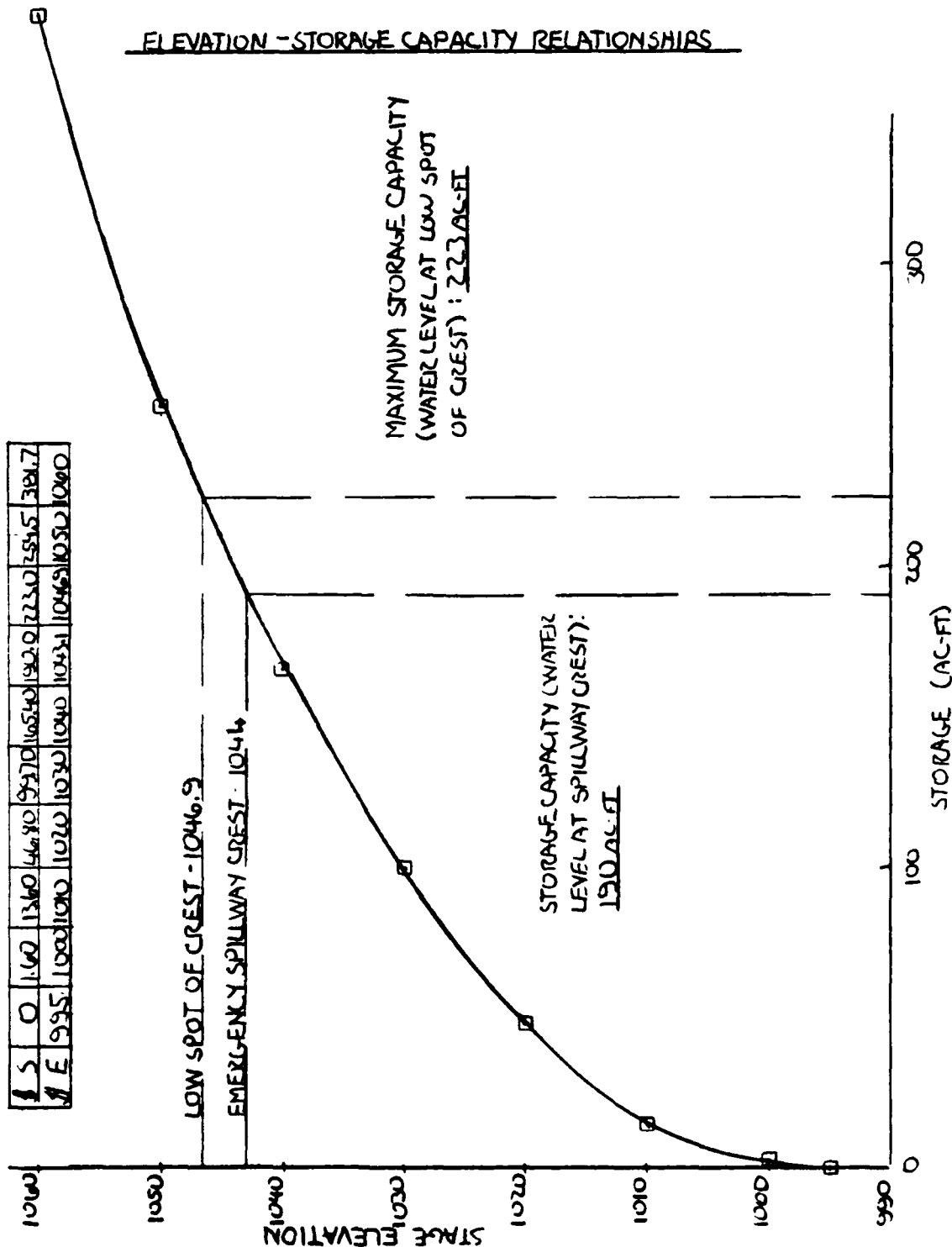
DAM NAME FISHPOND DAM

I.D. NUMBER \_\_\_\_\_

SHEET NO. 2 OF 4

BY JAG DATE \_\_\_\_\_

### ELEVATION - STORAGE CAPACITY RELATIONSHIPS





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DAM NAME FISHPOND DAM

I.D. NUMBER \_\_\_\_\_

SHEET NO. 3 OF 4

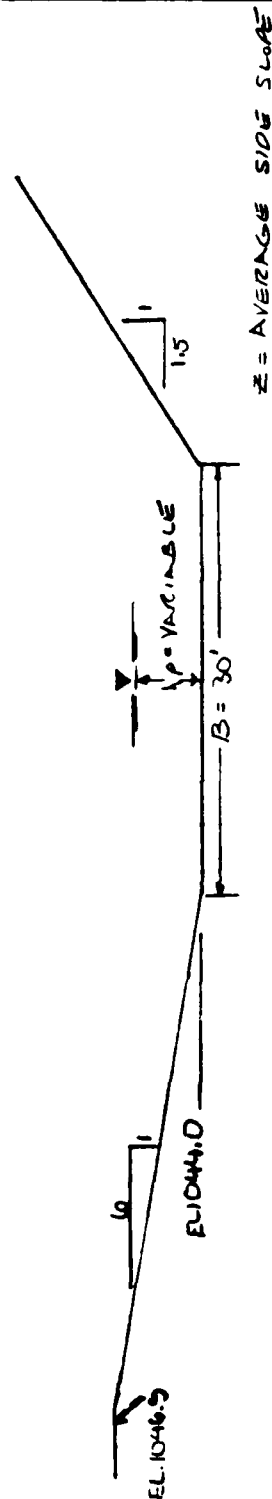
BY JAG DATE 4-21-80

# EMERGENCY SPILLWAY SECTION

NOT TO SCALE

## NOTE:

1. WEIR FLOW WILL OCCUR AT A WATER ELEVATION OF 1046.9
2. BOTTOM ELEVATION IS 1044.0
3. BOTTOM WIDTH EQUAL 30'





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DAM NAME FISHPOND DAM

I.D. NUMBER \_\_\_\_\_

SHEET NO. 4 OF 4

BY JAL DATE 4-21-82

### OVERTOP PARAMETERS

TOP OF DAM ELEVATION - 1046.9  
LENGTH OF CREST (EXCLUDING SPILLWAY) - 567'  
COEFFICIENT OF DISCHARGE = 3.0

#L	5	10	360	517	583	602	692	762	LENGTH
#V	1046.9	1047.0	1047.5	1048.0	1049.0	1050.0	1055.0	1060.0	ELEV.

### DISCHARGE RATING CURVE

TRAPEZOIDAL CURVE FROM:

$$Q = 8.03 C h_v^{1/2} (h_p - h_v) [B + Z(h_p - h_v)]$$

$$h_v = \frac{3(2Z h_p + B) - (16Z^2 h_p^2 + 16Z B h_p + 9B^2)^{1/2}}{10Z}$$

B = 30'

Z = 3.75

C = 0.95

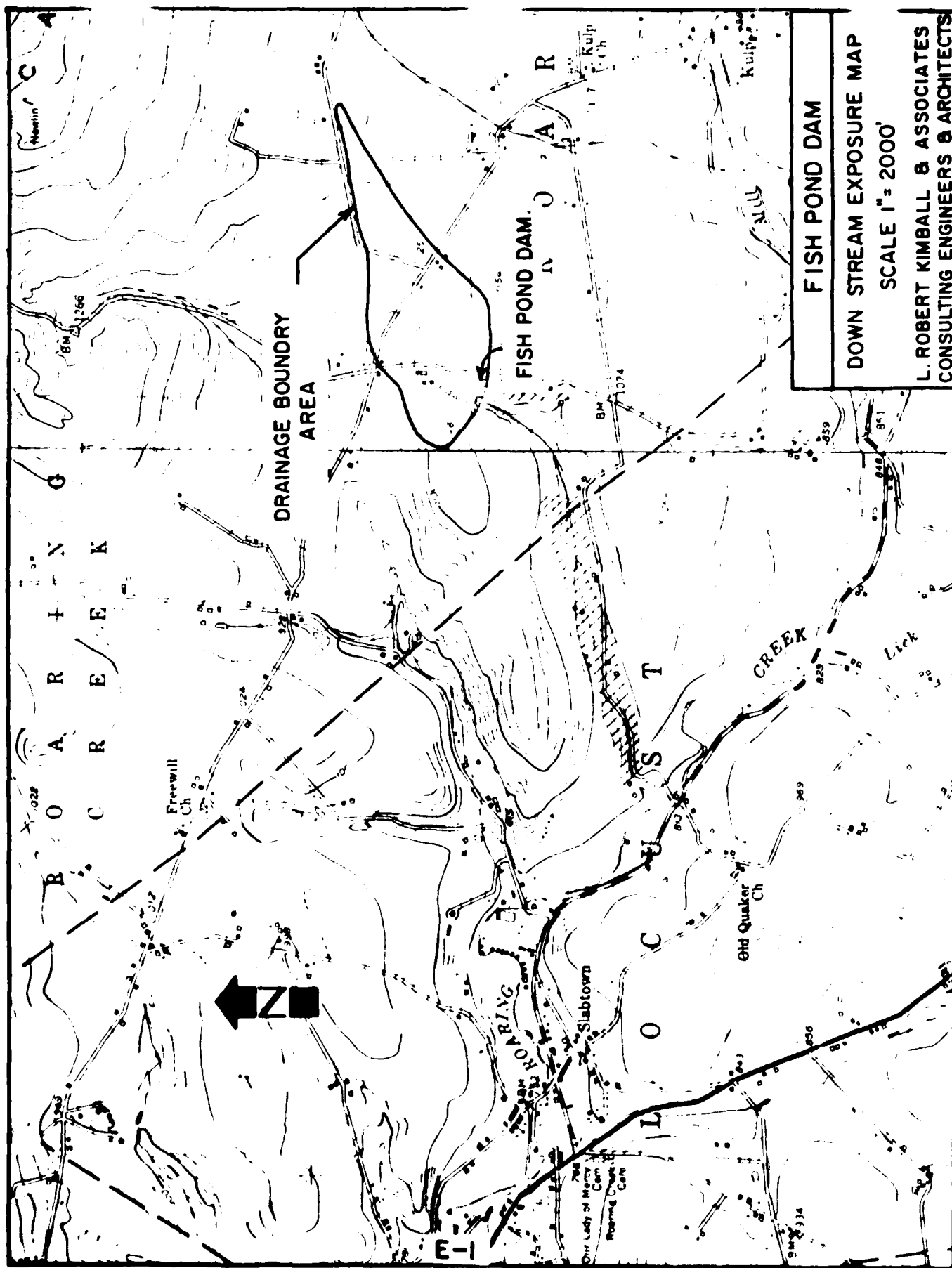
FROM: "WATER & WASTEWATER ENGINEERING" (11-14) & (11-15)  
FAIR, Geyer & OKUM 1966  
& "LOW DAMS" BY NATIONAL RESOURCE COMMITTEE 1938  
Eg's (7) & (8)

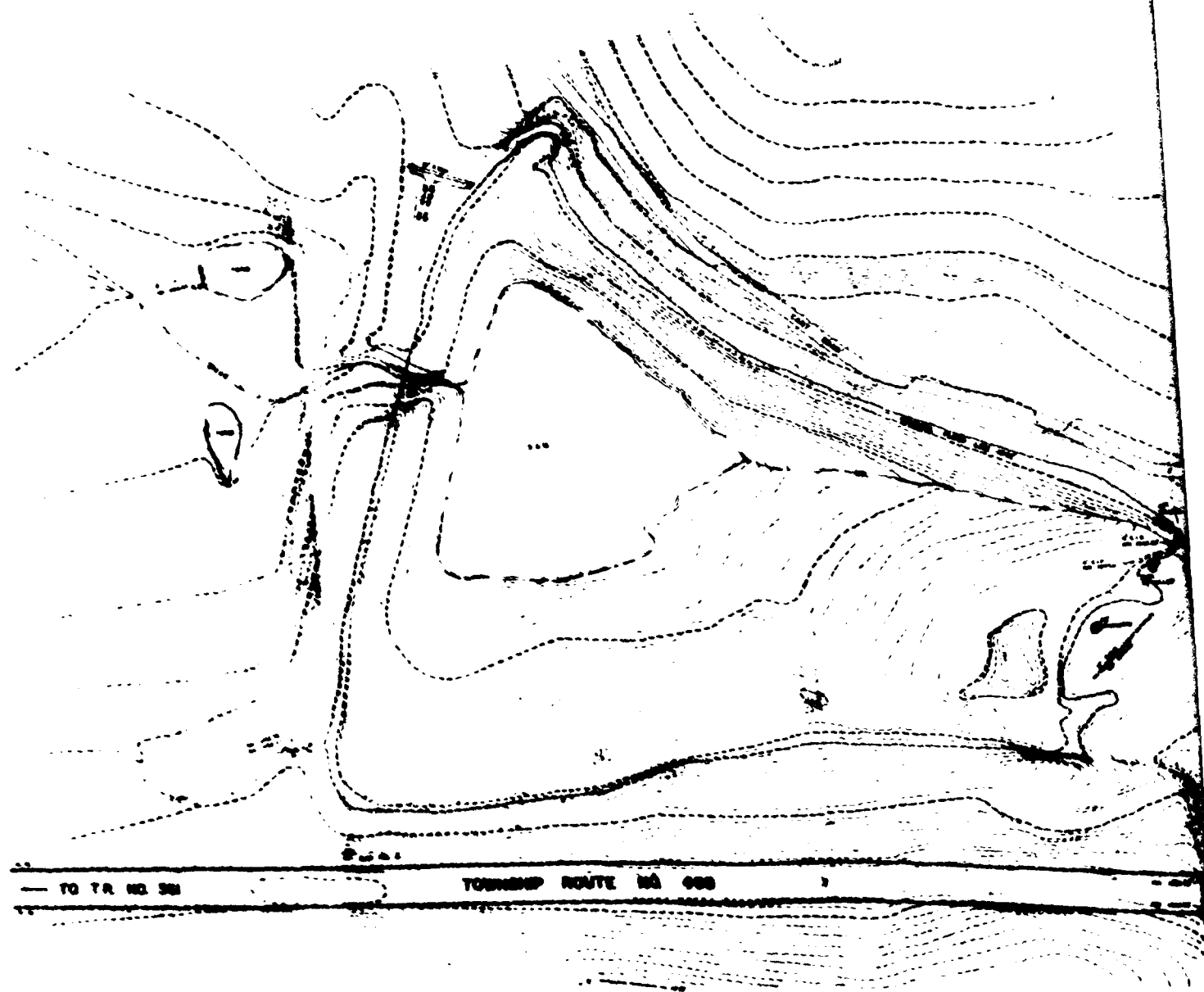
$$Q_{WEIR} (Q) = C L h^{3/2} \quad w/ \quad C = 3.1 \quad L = 567'$$

ELEVATION	TRAPEZOIDAL		WEIR		Q <sup>2</sup> TOTAL (CFS)
	h <sub>p</sub> (ft)	Q (CFS)	h <sub>p</sub> (ft)	Q (CFS)	
1044	0	0			0
1044.5	0.5	32			30
1045	1.0	96			100
1045.5	1.5	182			180
1046	2.0	292			290
1046.5	2.5	423			420
→ 1046.9	2.9	543	0	0	540
1048			1.1	207	750
1050			3.1	981	1520
1052			5.1	2071	2610

\* VALUES ROUNDED  
TO NEAREST 10

APPENDIX E  
DRAWINGS



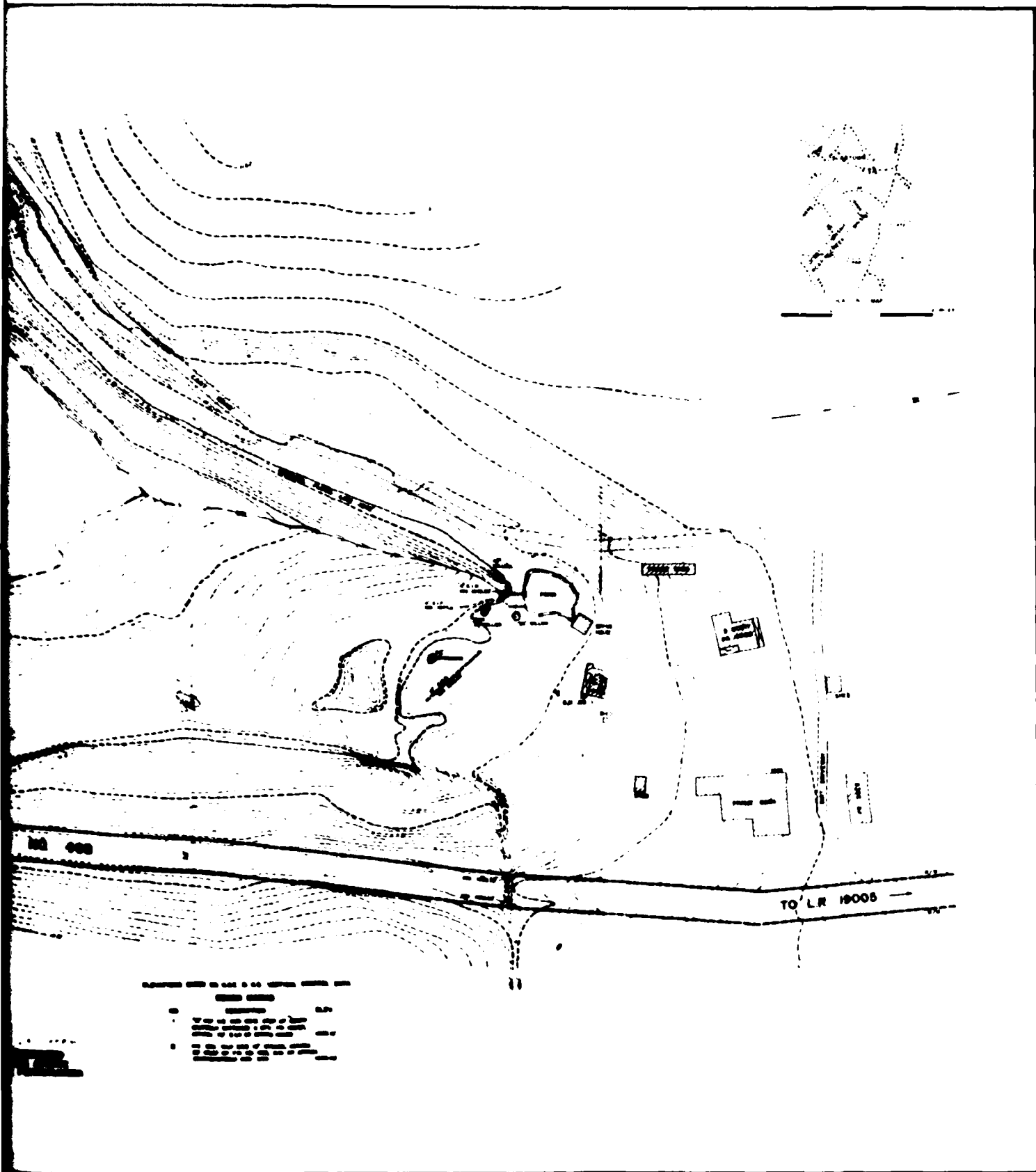


PROPOSED RESTORATION OF FISHPOND POND, DC.  
 SCALE: 1" = 100' (VERTICAL SCALE: 1" = 10')

LEGEND

1	Proposed Restoration Area
2	Existing Road
3	Proposed Road
4	Proposed Embankment
5	Proposed Ditch
6	Proposed Filling
7	Proposed Grading
8	Proposed Retention Wall
9	Proposed Bridge
10	Proposed Culvert
11	Proposed Drainage Structure
12	Proposed Access Road
13	Proposed Parking Area
14	Proposed Building
15	Proposed Utility Structure
16	Proposed Fencing
17	Proposed Signage
18	Proposed Landscaping
19	Proposed Irrigation System
20	Proposed Water Feature
21	Proposed Seating Area
22	Proposed Lighting
23	Proposed Security System
24	Proposed Maintenance Area
25	Proposed Storage Area
26	Proposed Office Building
27	Proposed Warehouse
28	Proposed Shop
29	Proposed Restaurant
30	Proposed Bar
31	Proposed Lounge
32	Proposed Theater
33	Proposed Auditorium
34	Proposed Convention Center
35	Proposed Sports Field
36	Proposed Tennis Courts
37	Proposed Golf Course
38	Proposed Park
39	Proposed Zoo
40	Proposed Aquarium
41	Proposed Botanical Garden
42	Proposed Arboretum
43	Proposed Conservatory
44	Proposed Greenhouse
45	Proposed Nursery
46	Proposed Landscaping Business
47	Proposed Horticulture Business
48	Proposed Florist
49	Proposed Garden Center
50	Proposed Plant Nursery
51	Proposed Seed Business
52	Proposed Fertilizer Business
53	Proposed Pesticide Business
54	Proposed Lawn Care Business
55	Proposed Tree Service
56	Proposed Landscaping Service
57	Proposed Garden Design
58	Proposed Planting Service
59	Proposed Maintenance Service
60	Proposed Water Feature Service
61	Proposed Seating Service
62	Proposed Lighting Service
63	Proposed Security Service
64	Proposed Maintenance Service
65	Proposed Storage Service
66	Proposed Office Service
67	Proposed Warehouse Service
68	Proposed Shop Service
69	Proposed Restaurant Service
70	Proposed Bar Service
71	Proposed Lounge Service
72	Proposed Theater Service
73	Proposed Auditorium Service
74	Proposed Convention Center Service
75	Proposed Sports Field Service
76	Proposed Tennis Courts Service
77	Proposed Golf Course Service
78	Proposed Park Service
79	Proposed Zoo Service
80	Proposed Aquarium Service
81	Proposed Botanical Garden Service
82	Proposed Arboretum Service
83	Proposed Conservatory Service
84	Proposed Greenhouse Service
85	Proposed Nursery Service
86	Proposed Landscaping Business Service
87	Proposed Horticulture Business Service
88	Proposed Florist Service
89	Proposed Garden Center Service
90	Proposed Plant Nursery Service
91	Proposed Seed Business Service
92	Proposed Fertilizer Business Service
93	Proposed Pesticide Business Service
94	Proposed Lawn Care Business Service
95	Proposed Tree Service Service
96	Proposed Landscaping Service Service
97	Proposed Garden Design Service
98	Proposed Planting Service Service
99	Proposed Maintenance Service Service
100	Proposed Water Feature Service Service

1



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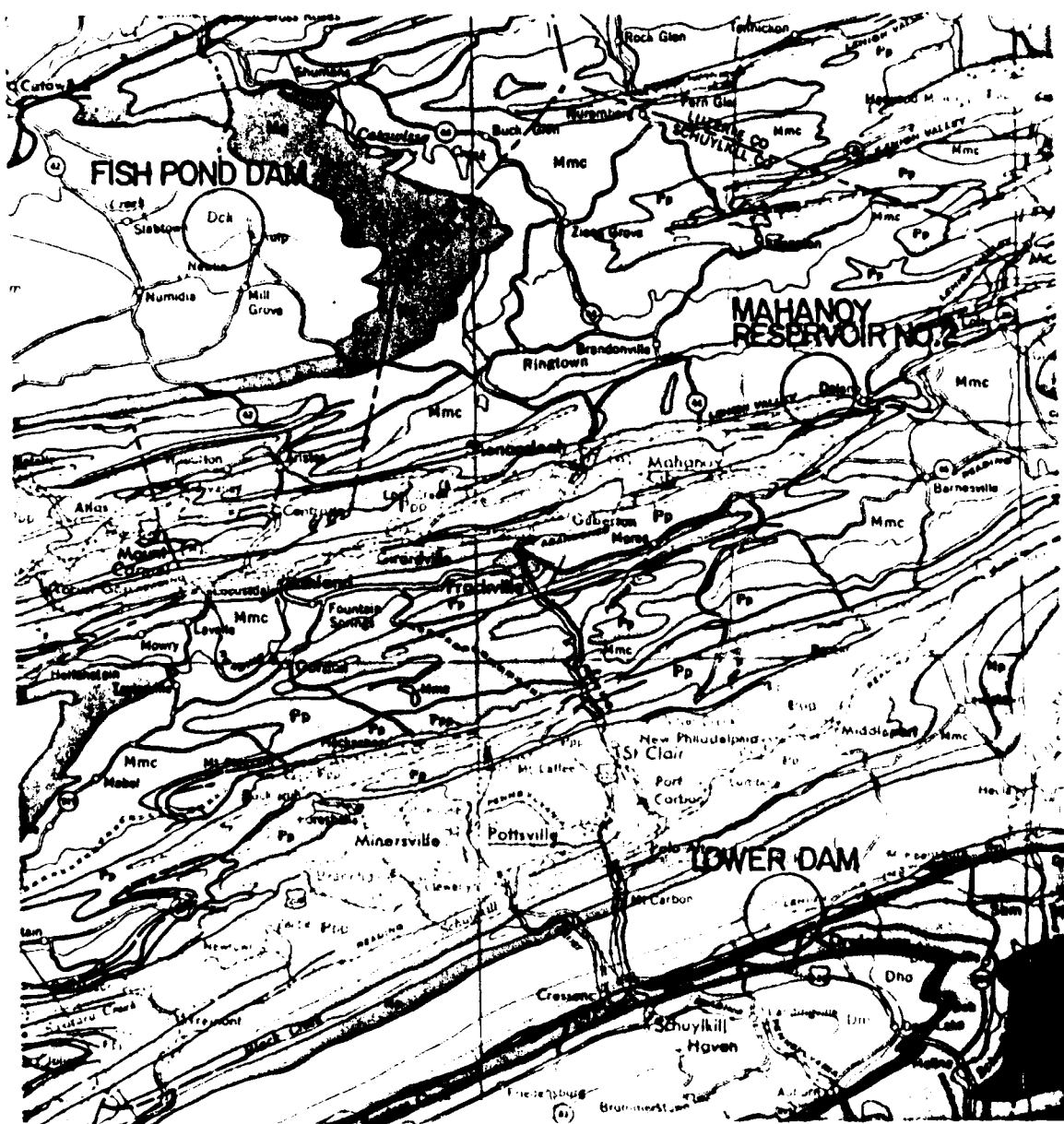
APPENDIX F  
GEOLOGY



### General Geology

Fishpond Dam lies within the Appalachian Mountain Section of the Valley and Ridge Physiographic Province. This area is characterized by overturned and assymetric folds, local shearing and large, low-angle thrust faults. There is some minor faulting indicated a few miles to the west and also to the northeast of the dam.

The bedrock underlying the dam consists of the Devonian aged Catskill formation. This is a complex unit consisting of sandstones, siltstones, shales and conglomerates. The usually well developed beds range in thickness from less than one foot to over fifteen feet. The well developed and closely spaced joints in the siltstones and shales are steeply dipping and form blocky or platy patterns. The formation is moderately resistant to weathering, except for the shales, which disintegrate rapidly. The foundation stability for heavy structures is good if excavated to sound material and the shales and siltstones are kept water free.



GEOLOGICAL MAP OF THE AREA AROUND FISH POND DAM,  
LOWER DAM AND MAHANOEY DAM NO. 2.

**Ps** Pottsville Group  
Pottsville Group

**Schuylkill** Schuylkill Formation  
Schuylkill Formation

SCALE 1 : 250,000